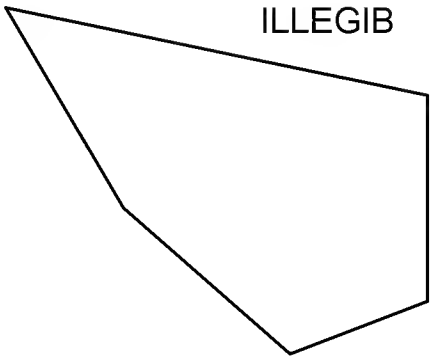

ADVANCED AERODYNAMIC RECONNAISSANCE SYSTEMS

A COMPARATIVE ANALYSIS

OF

QUICK REACTION-SURVIVABLE SYSTEM CONCEPTS

A Proposal Submitted

by

STAT [redacted]

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A. OBJECTIVES

STAT The [redacted] proposes to conduct a two-phase study of quick reaction-survivable reconnaissance systems which will provide ---

In Phase I - the synthesis and comparative evaluation of an appropriate number of candidate vehicle system concepts which are capable of accomplishing a penetration through techniques (profiles and tactics) to be defined by the sponsor. The interactions of specific operational requirements and constraints with several candidate system designs will be systematically evaluated. A rating of all candidate systems will be established.

In Phase II - a refinement of the selected reconnaissance system(s) to amplify analysis of crucial areas and define technology status, provide specific definition of major subsystems in cooperation with qualified suppliers, and provide a consolidated system definition and technical substantiation, including capabilities for alternate operational uses.

B. SCHEDULE

The Phase I study will be completed in six months. The last two months of this phase would be characterized by intensive review by the sponsor and iterative analysis [redacted] to validate those items which STAT have major impact on the comparative rating of competing quick reaction-survivable vehicle system concepts.

The Phase II study would be initiated approximately one month after completion of the Phase I study. Its duration would be six months, completing the in-depth definition of the most promising reconnaissance system concept(s) identified in Phase I.

C. APPROACH - PHASE I

Rapid identification of candidate flight vehicle concepts which can provide the flight profile and tactics defined by the sponsor is possible by exploiting the [redacted] experience that is germane STAT to the complete aerodynamic flight spectrum. After definition of conceptual baseline vehicle systems ~~are~~ is completed, a comprehensive synthesis of complete systems will be accomplished, including major subsystems. It is expected that a comprehensive matrix of competing vehicle system concepts will be established to achieve the desired flight profiles. The complete flight spectrum -- including high supersonic to ~~orbital~~ high hypersonic velocities, can be assessed through synthesis of realistic and practical vehicle concepts. Past work provides a ready source of key technical building blocks which can be substantiated in depth. For each specific vehicle concept, major technical element requirements which will be considered in achieving a balanced system design include:

a) Takeoff/boost propulsion system

b) Propellant system

c) Vehicle structural concept

d) Aerodynamic shape

e) Payload installation requirements

f) Propulsion mixes/staging

g) Vehicle recovery system

h) Flight control system - manned/unmanned options

Performance objectives, including flight profile requirements such as range, flight profile variability, navigational accuracy, and

maneuver capability, will be established for each candidate system in conjunction with the sponsor.

Each candidate system will be established as a balanced design in appropriate depth to permit determination of system costs (development, investment, and operating). [redacted] assess the potential of each vehicle system to accomplish alternate missions. STAT

The comparative vehicle evaluation will include assessment of the design impact of operational factors such as:

- Reaction time for ~~three~~ readiness postures
- Turnaround capability
- Basing requirements
- Data retrieval options
- Unmanned/manned options

Design options will be dependent upon the flight profile objectives, but major interactions expected to be appropriate for analysis are:

- Reaction time
- Radar cross section
- Vehicle launch alternates
- Vulnerability/Survivability
- Integral power vs. expendables
- Landing aids, including thrust augmentation
- Conceptual sensor alternates
- ECM alternates
- Communication links
- Payload variations

Factors to be considered in ranking candidate systems will include:

- o Capability to achieve desired flight profiles and tactics
- o Mission frequency
- o Mission versatility
- o Turnaround time
- o Reliability/mission confidence
- o Development time span
- o Development cost
- o Investment cost
- o Operating cost
- o Overall data collection system capability
- o Collection confidence

A key feature of the approach used in this program will be a disciplined approach to consolidate many diverse design and operational elements. While emphasis on key and/or critical design and operational elements (range, survivability, reaction time, etc.) will be necessary, full visibility to all those elements having a strong influence on the quality (mission and collection confidence, etc.) of the system concepts is also necessary to achieve credible and complete results of primary use to decision makers. In other words, an objective and practical evaluation, predicated upon satisfying critical elements evaluations, will be accomplished.